Sample Questions

Fundamentals of Physics

1. Identify the parameter on which the capacitance of a parallel-plate capacitor is dependent on.

   a. Area of the plate
   b. Distance between the plates
   c. Material of the plate
   d. All of the above

2. What can we say about the magnetic field inside an infinitely long, straight, thin walled pipe through which current 'I' flows along its length?

   a. The magnetic field at any point is time-dependent.
   b. The magnetic field is different at different points inside the pipe.
   c. The magnetic field at any point inside the pipe is zero.
   d. The magnetic field at all the points inside the pipe is same, but nonzero.

3. Statement 1 - Potential difference across the battery is always equal to the emf of the battery.
Statement 2 - Work done by the battery per unit charge is called the emf of the battery.

   a. Statement 1 is true but Statement 2 is false.
   b. Statement1 is false but Statement2 is true.
   c. Statements1 and 2 are true and Statement 2 is the correct explanation of Statement1.
   d. Statements1 and 2 are true but Statement2 is not the correct explanation of Statement 1.

4. The interpretation of the given graph by 4 studentsisas follows:

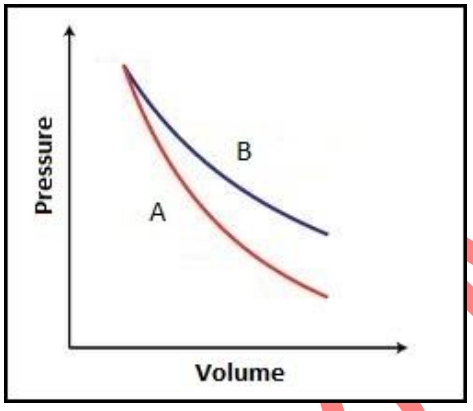
Student 1: 'A' may be an isotherm while 'B' may be adiabatic.

Student 2: Both 'A' and 'B' may be isotherms.

Student 3: 'A' may be adiabatic while 'B' may be an isotherm.

Student 4: 'A' is isochoric while 'B' may be adiabatic.

Which student has interpreted it correctly?



a. Student 1
b. Student 2
c. Student 3
d. Student 4

5. Which mechanism(s)is/are responsible for the sea breezes that occur during day and night at the shore?

a. Convection
b. Radiation
c. Conduction
d. Convection and Radiation

6. A train traveling with a certain velocity passes a stationary observer. The apparent frequency of the whistle of the engine changes in the ratio 7:4 as it passes the observer. If the velocity of the sound is 330m/s, then the velocity of the engine is _____.

a. 40m/s
b. 90 m/s
c. 340m/s
d. 180m/s

7. Let the decay constant of a radioactive sample be k. Identify the correct combination.

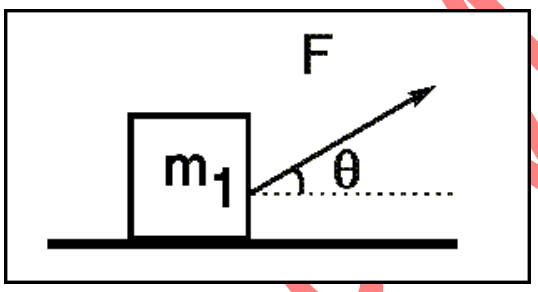
a. **Half-life:**(ln2)/k
Mean-life:k

b. **Half-life**: (ln2)/k
Mean-life: 1/k

b. **Half-life**: 1/k
Mean-life:(ln2)/k

d. **Half-life:** k/(ln2)
Mean-life:1/k

8. A man pulls a box of mass m1 with force F. Let **g** be the acceleration of gravity. What will be the normal force acting on the box be?



a. $m_1g + F.Cos(\theta)$
b. $F.Sin(\theta)$
c. $m_1g - F.Sin(\theta)$
d. $\mu(m_1g - F\ Sin(\theta))$

9.Two billiard balls collide during a game. After collision, the first ball slowly comes to a halt, and the second ball starts moving with a greater speed. This is due to _____.

a. law of conservation of mass
b. law of conservation of energy
c. law of conservation of momentum
d. law of conservation of matter